ABOUT THIS DOCUMENT

This biogeographic assessment represents the continuation of an ongoing partnership between the National Marine Sanctuary Program (NMSP) and the National Centers for Coastal Ocean Science (NCCOS). The purpose of this collaboration is to provide sanctuary managers with basic information on the distribution of marine flora and fauna relevant to the national marine sanctuaries they manage. This particular work, conducted in collaboration with the Channel Islands National Marine Sanctuary (CINMS) and members of the local research community, builds on a previous assessment developed for California's other three national marine sanctuaries (NOAA, 2003). These efforts were undertaken specifically to support the management plan revision process mandated for each sanctuary. This process evaluates the degree that each sanctuary is meeting its goals and allows an opportunity for the public to determine if there are new directions or issues that they feel the sanctuary should address. One issue raised by the public during the CINMS management plan revision process was whether the sanctuary boundaries should be expanded. A significant portion of this document, therefore, is devoted toward providing a biogeographic assessment of the differing boundary concepts previously developed by CINMS in conjunction with the Sanctuary Advisory Council and general public. This was accomplished by a thorough analysis of the biogeographic datasets provided to the analytical team by the local research community. Additionally, the data gathered, analyses performed, and patterns of distribution observed should provide invaluable information to support science, education, and support other spatially-explicit management decisions.

The results of this assessment are available via both hard copy and CD-ROM. Also available on the CD-ROM are the data utilized to develop the Habitat Suitability Models along with the ArcGIS project files used to develop many of the figures within this report (e.g. species distribution, substrate and oceanographic maps). For more information on this effort please visit the NCCOS Biogeography Team webpage dedicated to this project at: http://biogeo.nos.noaa.gov/projects/assess/ca_nms/cinms/ or direct questions and comments to:

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EXECUTIVE SUMMARY

The priority management goal of the National Marine Sanctuaries Program (NMSP) is to protect marine ecosystems and biodiversity. This goal requires an understanding of broad-scale ecological relationships and linkages between marine resources and physical oceanography to support an ecosystem management approach. The Channel Islands National Marine Sanctuary (CINMS) is currently reviewing its management plan and investigating boundary expansion. A management plan study area (henceforth, Study Area) was described that extends from the current boundary north to the mainland, and extends north to Point Sal and south to Point Dume. Six additional boundary concepts were developed that vary in area and include the majority of the Study Area. The NMSP and CINMS partnered with NOAA's National Centers for Coastal Ocean Science Biogeography Team to conduct a biogeographic assessment to characterize marine resources and oceanographic patterns within and adjacent to the sanctuary. This assessment includes a suite of quantitative spatial and statistical analyses that characterize biological and oceanographic patterns in the marine region from Point Sal to the U.S.-Mexico border. These data were analyzed using an index which evaluates an ecological "cost-benefit" within the proposed boundary concepts and the Study Area.

The sanctuary resides in a dynamic setting where two oceanographic regimes meet. Cold northern waters mix with warm southern waters around the Channel Islands creating an area of transition that strongly influences the regions oceanography. In turn, these processes drive the biological distributions within the region. This assessment analyzes bathymetry, benthic substrate, bathymetric life-zones, sea surface temperature, primary production, currents, submerged aquatic vegetation, and kelp in the context of broad-scale patterns and relative to the proposed boundary concepts and the Study Area. Boundary cost-benefit results for these parameters were variable due to their dynamic nature; however, when analyzed in composite the Study Area and Boundary Concept 2 were considered the most favorable.

Biological data were collected from numerous resource agencies and university scientists for this assessment. Fish and invertebrate trawl data were used to characterize community structure. Habitat suitability models were developed for 15 species of macroinvertebrates and 11 species of fish that have significant ecological, commercial, or recreational importance in the region and general patterns of ichthyoplankton distribution are described. Six surveys of ship and plane at-sea surveys were used to model marine bird diversity from Point Arena to the U.S.-Mexico border. Additional surveys were utilized to estimate density and colony counts for nine bird species. Critical habitat for western snowy plover and the location of California least tern breeding pairs were also analyzed. At-sea surveys were also used to describe the distribution of 14 species of cetaceans and five species of pinnipeds. Boundary concept cost-benefit indices revealed that Boundary Concept 2 and the Study Area were most favorable for the majority of the species-specific analyses. Boundary Concept 3 was most favorable for bird diversity across the region. Inadequate spatial resolution for fish and invertebrate community data and incompatible sampling effort information for bird and mammal data precluded boundary cost-benefit analysis.

The final chapter integrates data and analyses from each of the preceding chapters utilizing two separate approaches. Cost-benefit indices were ranked for each biological group and for the oceanographic/physical parameters to provide a consistent and comprehensive evaluation of the boundary concepts. The Study Area and Boundary Concept 2 (see Chapter 1) ranked highest for the bird, fish, and mammal groups, as well as all the data in composite. The Study Area also ranked highest for macroinvertebrates. Second, select spatial data were integrated, based on data compatibility and spatial range, to identify areas of spatial coincidence which may reflect ecosystem "hotspots". Habitat suitability models for fish and macroinvertebrates, along with bird and mammal sightings information were utilized to evaluate this spatial coincidence. Areas of highest spatial coincidence most closely resemble the spatial delineation for the Study Area and also include a broad area from the mainland south through San Clemente Island.

Integration results highlight the Channel Islands and the area extending north to the mainland to Point Conception as an important ecosystem that supports a diverse array of biological communities. The boundary concepts that were favorably ranked incorporated large areas of the coastal mainland, due in part to the nearshore affinity exhibited by many of the analyzed species. Deep offshore environments away from the Channel Islands were

correspondingly less favorable. Both the Study Area and Boundary Concept 2 are characterized by areas of increased upwelling, dynamic surface currents and eddies, and persistent thermal fronts. These concepts also include large areas of important habitats such as kelp, seagrasses, and wetlands along with a mixture of deep and shallow waters that many species depend on for all or part of their life cycles.

In compliance with the National Environmental Policy Act, the National Marine Sanctuary Program will incorporate this assessment with cultural and socio-economic analyses to prepare a Supplemental Environmental Impact Statement to fully analyze boundary change concepts.

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